

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application. Claims indicated as previously added were added in the Amendment filed July 30, 2001. Amendments to claims submitted herein are fully supported by the specification, therefore no new matter is added by these Amendments.

Listing of Claims

30. (Currently amended) A catalyst composition comprising the product resulting from the combination of

a) a chromium catalyst having a pore volume of at least ~~1.8 g/cc~~ 1.8 cc/g and a surface area of at least 400 m²/g produced by contacting a chromium-containing, titanium-containing, silica-containing solid with carbon monoxide under conditions such that a substantial portion of the chromium is in the divalent state after contacting with carbon monoxide; and

b) a cocatalyst selected from ~~the group consisting of~~ i) alkyl lithium or aryl lithium compounds; ii) dialkyl aluminum alkoxides in combination with at least one compound selected from ~~the group consisting of~~ alkyl zinc compounds, alkyl aluminum compounds, ~~and~~ alkyl boron compounds, or mixtures thereof; ~~and or~~ iii) mixtures thereof.

31. (Previously added) A catalyst composition according to claim 30 wherein said cocatalyst comprises an alkyl lithium compound.

32. (Previously added) A catalyst composition according to claim 31 wherein said alkyl lithium compound has 1 to 12 carbon atoms.

33. (Previously added) A catalyst composition according to claim 31 wherein said alkyl lithium compound has 1 to 5 carbon atoms.

34. (Previously added) A catalyst composition according to claim 33 wherein said alkyl lithium compound comprises n-butyl lithium.

35. (Currently amended) A catalyst composition according to claim 34 wherein the alkyl lithium compound is used in an amount so as to give an atom ratio of lithium ~~metal~~ to chromium ~~metal~~ in the range of about 0.5:1 to 10:1.


36. (Previously added) A catalyst composition according to claim 34 wherein the chromium catalyst contains about 0.5 to about 5 weight percent chromium and about 0.1 to 7 weight percent titanium.

37. (Currently amended) A composition according to claim 30 wherein said lithium compound is used in an amount so as to give an atom ratio of lithium ~~metal~~ to active chromium catalyst component within a range of about 0.5:1 to about 10:1.

38. (Previously added) A composition according to claim 30 wherein the chromium catalyst is prepared by calcining a chromium-containing, titanium-containing, silica-containing solid with oxygen at a temperature in the range of about 400 to about 900 degrees C to convert a substantial portion of the chromium to the hexavalent state and then contacting the calcined

product with carbon monoxide at a temperature in the range of about 300 to about 500 degrees C to convert a substantial portion of the chromium to the divalent state.

39. (Currently amended) A composition according to claim 30 wherein said cocatalyst is a dialkyl aluminum alkoxide in combination with at least one ~~alkyl~~ compound selected from ~~the group consisting of~~ alkyl zinc compounds, alkyl aluminum compounds, alkyl boron compounds, ~~and~~ or mixtures thereof.

 40. (Previously added) A composition according to claim 39 wherein said alkyl compound is an alkyl zinc compound.

41. (Previously added) A composition according to claim 40 wherein said alkyl zinc compound is diethyl zinc.

42. (Previously added) A composition according to claim 39 wherein said alkyl compound is an alkyl aluminum compound.

43. (Previously added) A composition according to claim 42 wherein said alkyl aluminum compound is triethyl aluminum.

44. (Previously added) A composition according to claim 39 wherein said alkyl compound is an alkyl boron compound.

45. (Previously added) A composition according to claim 44 wherein said alkyl boron compound is triethylboron.

46. (Currently amended) A dual catalyst composition comprising:

1) a polymerization catalyst system comprising a chromium catalyst composition resulting from the combination of

B1 Cont
a) a chromium catalyst having a pore volume of at least ~~1.8 g/cc~~ 1.8 cc/g and a surface area of at least 400 m²/g produced by contacting a chromium-containing, titanium-containing, silica-containing solid with carbon monoxide under conditions such that a substantial portion of the chromium is in the divalent state after contacting with carbon monoxide; and

b) a cocatalyst selected from ~~the group consisting of~~ i) alkyl lithium or aryl lithium compounds; ii) dialkyl aluminum alkoxides in combination with at least one compound selected from ~~the group consisting of~~ alkyl zinc compounds, alkyl aluminum compounds, ~~and~~ alkyl boron compounds, or mixtures thereof; ~~and or~~ iii) mixtures thereof; and

2) e) a Ziegler-Natta catalyst composition produced by combining a halide of a metal selected from ~~the group consisting of~~ titanium, vanadium, ~~and or~~ zirconium and an organoaluminum compound.

47. (Previously added) A catalyst composition according to claim 46 wherein the organoaluminum of the Ziegler-Natta catalyst composition comprises a triethylaluminum compound.

61. (New) A catalyst composition comprising the product resulting from the combination of:

a) a chromium catalyst having a pore volume of at least 1.8 cc/g and a surface area of at least 400 m²/g; and

b) a cocatalyst selected from i) alkyl lithium or aryl lithium compounds; ii) dialkyl aluminum alkoxides in combination with at least one compound selected from alkyl zinc compounds, alkyl aluminum compounds, alkyl boron compounds, or mixtures thereof; and iii) mixtures thereof;

Bz wherein the chromium catalyst consists essentially of a chromium-containing, titanium-containing, silica-containing solid that has been contacted with carbon monoxide under conditions such that a substantial portion of the chromium is in the divalent state after contacting with carbon monoxide.

62. (New) A catalyst composition comprising the product resulting from the combination of:

a) a chromium catalyst having a pore volume of at least 1.8 cc/g and a surface area of at least 400 m²/g produced by contacting a chromium-containing, titanium-containing, silica-containing solid with carbon monoxide under conditions such that a substantial portion of the chromium is in the divalent state after contacting with carbon monoxide; and

b) a cocatalyst selected from i) alkyl lithium or aryl lithium compounds; ii) dialkyl aluminum alkoxides in combination with at least one compound selected from alkyl zinc

compounds, alkyl aluminum compounds, alkyl boron compounds, or mixtures thereof; and iii)
mixtures thereof;

22 wherein the chromium catalyst is substantially free of fluorine.

(Please cancel Claims 48-60 without prejudice.)